UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/768,301	01/25/2001	Sang Kyun Cha	K-254	4139

			EXAMINER
34610	7590	12/18/2003	TO, BAOQUOC N

FLESHNER & KIM, LLP
P.O. BOX 221200
CHANTILLY, VA 20153

ART UNIT	PAPER NUMBER
2172	

DATE MAILED: 12/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	09/768,301	CHA ET AL.
	Examiner	Art Unit	
	Baoquoc N To	2172	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☐ Responsive to communication(s) filed on _____.

2a) ☒ This action is **FINAL**.   2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
    closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-37* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-37* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage
      application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application)
    since a specific reference was included in the first sentence of the specification or in an Application Data Sheet.
    37 CFR 1.78.

    a) ☐ The translation of the foreign language provisional application has been received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific
    reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.

4) ☐ Interview Summary (PTO-413) Paper No(s). _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: .

DETAILED ACTION

1.   Claims 1-36 are pending in this application and newly added is 37 in the

amendment filed on 09/26/03.

Response to Arguments

2.   Applicant's arguments filed 09768301 have been fully considered but they are

not persuasive.

The applicant argues that, "Bordsen does not teach or suggest recovering from a

failure by replaying the differential records in an arbitrary order, which is independent of

the order of generation of the generation of the logs records, by using bit-wise XOR

operations."

The examiner respectfully disagrees with the above argument because Bordsen

teaches XOR or exclusive-OR failure and recovery system using the Roll-forward and

Rolled-Back recovery (col. 8, lines 35-45). As taught in Bordsen's, implementation of

the log is included because the system must recognize the point of failure in order to

process with Roll-Forward or Rolled-Back. The order of playing back is when the

recovery of point of failure for example the update to the database or the audit media so

that the process is determines Rolled-Back or Roll-Forward (col. 8, lines 39-46).

The applicant argues that, "Bordsen et al. fails to disclose the parallelism in

logging and recovery, which is recited in "parallel logging and parallel recovery" and

"distributing the generating differential log records in parallel".

The examiner respectfully disagrees with the applicant because Parallel recovery

is not recited in the claim. Secondly, Bordsen also discloses parallel processing (col. 6,

lines 37-38), which would teach for the parallel logging.

The applicant argues that, "Bordsen does not discloses these features replaying

the different records in an arbitrary order which is independent of the order of

generation of the log records and distributing the generating different log records in

parallel to said persistent log storage devices."

The examiner respectfully disagrees with the above argument because as

previously discussed the implementation of log and the order of playing back are taught

Bordsen. Secondly, Bordsen also discloses for parallel processing, which also

suggests for parallel logging as previously discussed.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

3.   Claims 1-3, 25 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Bordsen et al. (US. Patent No. 5,193,162).

Regarding on claims 1, 24, and 34, Bordsen teaches a method of logging

updates and recovering from failure in a transaction system having main memory for

storing a database, one or more persistent backup storage devices for storing the data

in the main memory, and one or more persistent log storage devices for storing log

records for parallel logging and parallel recovery, the logging method comprising:

Generating different log records by applying bit-wise exclusive-OR (XOR)

operation between a before-update image and an after-update image (col. 11, lines 29-

33);

Distributing the generated differential log records in parallel to said persistent log

storage devices (parallel processing) (col. 6, lines 38-40); and

Borden does not explicitly teach recovering from a failure by replaying the

different record in an arbitrary order, which is independent of the order of generation of

the log records, by using bit-wise operations. However, Borden teaches, "in case of a

failure during the update of the database, the audit copy can be used to update the

database. This recovery action is called a Roll-Forward of the transaction. If there is a

failure during the write to the audit media, the database is unaltered and there the old,

before-look image is still good. In this case, the transaction is call a Roll-Back word

recovery, and the update must be retired" (col. 8, lines 35-45). This teaches the log

keeps track the update process for example the before of after in order to perform the

roll-back or roll-forward transaction. And the before or after images records are the

records in the logs that is independent order of before of after. Since the claim is in the

broad term, and the different logs records are not well define. Borden's teaching read

into the claimed limitations. Therefore, it would have been obvious to one ordinary skill

in the art at the time of the invention was made to including the log of capturing of

before and after of the transaction in order to recovery the record in the most current

state.

Regarding on claims 2 and 25, Bordsen teaches the database comprises a

plurality of fixed-size pages (pages) (col. 8, line 9).

Regarding on claim 3, Bordsen teaches each log record has a log header

comprising:

LSN (Log Sequence Number) for storing log sequence (col. 8, lines 14-17);

(TID) (Transaction ID) for storing the identity of the transaction that created the

log record (col. 8, lines 10-13);

previous LSN for storing the identity of the most recently created log by the same

transaction (col. 8, lines 14-17);

Type for storing the type of the log record (col. 8, lines 20-24);

Backup ID for storing the relation between the log record and the updated page

for use with fuzzy check pointing (col. 8, lines 35-40);

Page ID for storing the identity of an updated page (col. 8, lines 35-40);

Offset for storing the starting offset of an updated area within the updated page

(col. 8, lines 47-49); and

Size for storing the size of the updated area (col. 8, lines 50-52).

Regarding on claim 37, Bordsen teaches one or more memory buffers wherein

each generated log record is temporarily stored in any available log buffer and a group

of the buffer log records are written together to an arbitrary one of said one or more

persistent log storage devices (col. 8, lines 30-45).

4.   Claims 4-24 and 26-37 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Bordsen et al. (US. Patent No. 5,193,162) in view of Bohannon et

al. (US. Patent No. 6,449,623).

Regarding on claim 4, Bordsen does not explicitly teach checkpointing by

occasionally writing the database in the main memory to said one or more persistent

back storage devices. However, Bohannon teaches, "during a check point, a dirty

pages from the in-memory database image are written to disk" (col. 11, lines 28-30).

This teaches the pages from the database images are copied into the storage device.

Therefore, it would have been obvious to one ordinary skill in the art at the time of the

invention was made to modify the teaching of Bohannon into Bordsen because utilizing

the check points to copy the database image to the disk would allow the restore of the

image of the database before the system failures.

Regarding on claim 5, Bordsen does not teach the step of checkpointing uses the

transaction.

However, Bahannon teaches the step of checkpointing uses the transaction (col.

11, line 42).

Therefore, it would have been obvious to one ordinary skill in the art at the time

of the invention was made to combine the teaching of Bahannon and Bordsen because

utilizing the check points to copy the database image to the disk would allow the restore

of the image of the database before the system failures.

Regarding on claim 6, Bordsen does not teach the step of checkpointing uses the

action consistent.

However, Bohannon teaches the step of checkpointing uses the action consistent checkpointing policy (col. 11, lines 33-37).

Therefore, it would have been obvious to one ordinary skill in the art at the time of the invention was made to combine the teaching of Bahannon and Bordsen because utilizing the check points to copy the database image to the disk would allow the restore of the image of the database before the system failures.

Regarding on claims 7 and 29, Bordsen does not teach the step of checkpointing uses the fuzzy checkpointing policy.

Bordsen does not teach the step of checkpointing uses the fuzzy checkpointing policy (col. 11, lines 33-37).

Therefore, it would have been obvious to one ordinary skill in the art at the time of the invention was made to combine the teaching of Bahannon and Bordsen because utilizing the check points to copy the database image to the disk would allow the restore of the image of the database before the system failures.

Regarding on claims 8 and 30, Bordsen teaches the step of recovering comprises the step of:

Loading the checkpoint database from said one or more persistent backup storage devices into the main memory database (col. 9, lines 39-55); and

Loading the log from said one or more persistent log storage devices into the main memory database in order to restore the main memory database to the most recent consistent state (col. 9, lines 22-28).

Regarding on claim 9, Bordsen teaches the step of loading the checkpoint database is executed in parallel by partitioning the backup data (col. 7, lines 28-29).

Regarding on claims 10 and 32, Bordsen teaches replaying the log records is done two passes by separating a redoing pass and an undoing pass (col. 9, lines 22-28).

Regarding on claims 11, 13, 15, 20 and 22, Bordsen teaches reading the log records and replaying the log records are executed in a pipeline (col. 8, lines 61-67).

Regarding on claims 12 and 16, Bordsen teaches reading the log records is executed in parallel by partitioning the log records as well as replaying the log records (col. 9, lines 22-28).

Regarding on claims 14 and 33, Bordsen teaches replaying the log records is done in one pass (col. 9, lines 22-28).

Regarding on claims 16 and 21, Bordsen teaches reading the log records and replaying the log records are executed in parallel by partitioning the log records (col. 9, lines 39-55).

Regarding on claim 18, Bordsen teaches filling the main memory database with 0s in advance (col. 8, lines 10-13).

Regarding on claims 19 and 31, Bordsen teaches loading the checkpointed database comprises:

Reading the checkpointed database from said one or more (checkpointed database) (non-volatile memory) (col. 9, lines 39-55); and

Playing the checkpointed database by applying the XOR operation between the

checkpointed database and the main memory database (col. 9, lines 22-28).

Regarding on claim 21, Bordsen teaches reading the checkpointed database is

executed in parallel by partitioning the checkpointed database as well as playing the

backup data (col. 7, lines 28-29).

Regarding on claim 23, Bordsen teaches loading the backup data and of loading

the log records are executed in parallel (col. 7, lines 28-29).

Regarding on claim 35, Bodsen teaches the medium is a CD (storage media)

(col. 9, lines 24).

Regarding on claim 36, Bodsen teaches the medium is a magnetic tape (col. 9,

lines 25-26).

Conclusion

5.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of

timepolicy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Stifflers (US. Patent No. 5,751,939)   Date: 05/12/03

Stiffler's system use for recovery to the current state using the exclusive-OR having the before and after image, and the data is restored from the memories.

Contact Information

6.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Baoquoc N. To whose telephone number is (703) 305-1949 or via e-mail BaoquocN.To@uspto.gov. The examiner can normally be reached on Monday-Friday: 8:00 AM – 4:30 PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kim Y. Vu can be reached at (703) 305-4393.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231.

The fax numbers for the organization where this application or proceeding is assigned are as follow:

- (703) 746-7239   [Official Communication]

Hand-delivered responses should be brought to:

Crystal Park II

2121 Crystal Drive

Arlington, VA 22202

Fourth Floor (Receptionist).

Baoquoc N. To

Dec 12, 2003

SHAHID ALAM

PRIMARY EXAMINER